# Appendix M

Wildlife Specialist Report

Resource: Wildlife

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## Wildlife Specialist Report

**EXISTING CONDITIONS SUMMARY (GENERAL WILDLIFE)**

There are four major wildlife habitat types found in the LCM project area. Included are:

1) Ponderosa Pine Forest and Woodlands
2) Eastside (Interior) Mixed Conifer Forest
3) Western Juniper and Mountain Mahogany Woodlands
4) Eastside (Interior) Riparian-Wetlands

Number of wildlife species associated with each habitat type (O'Neil et al. 2001).

| Taxonomic Class | Habitat Type | | | |
|---|---|---|---|---|
| | Ponderosa Pine Forest and Woodlands | Eastside (Interior) Mixed Conifer Forest | Western Juniper and Mahogany Woodlands | Eastside (Interior) Riparian - Wetlands |
| Amphibians | 13 | 12 | 7 | 14 |
| Reptiles | 21 | 11 | 16 | 10 |
| Birds | 131 | 101 | 101 | 163 |
| Mammals | 67 | 80 | 43 | 79 |
| All Species | 232 | 219 | 167 | 266 |

Habitat functions in the LCM area have been modified from historic conditions. Practices such as timber harvest, fire suppression, grazing, mining, and roading have changed the quantity and quality of wildlife habitat for many species.

Historically, the presence and structure of forests dominated by Douglas-fir and grand fir were influenced by frequent, low-intensity ground fires that reduced densities of trees and surface vegetation (Sallabanks et al. 2001). For low elevation cover types, primarily ponderosa pine forests and woodlands, this disturbance regime produced open, park-like stands of all ages but predominantly large ponderosa pine, with a grass dominated understory. These forest were regularly interrupted by non-forest openings (Franklin and Dyrness 1988, and Thomas 1979). As a result, Eastside (interior) forests and woodlands were historically fragmented (Sallabanks et al. 2001).

Pre-1900, most of the Ponderosa Pine habitat in the analysis area was mostly open and park like with relatively few undergrowth trees. Currently, much of this habitat has a younger tree cohort of more shade-tolerant species that gives the habitat a more closed, multilayered canopy. For example, this habitat includes previously natural fire-maintained stands in which grand fir can eventually become the canopy dominant. Fire suppression has lead to a buildup of fuels that in turn increase the likelihood of stand-replacing fires (Chappell et al. 2001) and have detrimental effects on wildlife (Langston 1995).

The Western Juniper and Mountain Mahogany Woodlands habitat type is dominated by fire-sensitive species, and therefore, the range of western juniper and mountain mahogany has expanded because of an interaction of livestock grazing and fire suppression (Chappell 2001). Quigley and Arbelbide (1997) concluded that in the Inland Pacific Northwest, Juniper/Sagebrush, Juniper Woodlands, and Mountain Mahogany cover types now are significantly greater in extent than before 1900.

Riparian areas are the most critical wildlife habitats in the analysis area. Wildlife use streamsides as "connectors", or travel lanes between forested habitats as well as for maternity sites, and safe zones. Large mammals, furbearers, and predators use riparian zones as travel corridors to and from summer and winter ranges and between feeding, resting, breeding, brooding, and rearing habitats (Brown 1985). Shrub conditions in riparian areas are especially critical due to the diversity of species that utilized these areas

The analysis area is located in the Murderer's Creek Wildlife Management Unit. Both deer and elk are present and use the analysis area for rutting, calving, and fawning. Approximately 85% of the analysis area is considered to be crucial mule deer winter range.

The high road densities associated with the analysis area is reducing the habitat security for many species. The Interior Columbia Basin Review stratified road density levels as follows: none to very low (0 - .1 m/m2), low (.1 - .7 m/m2), moderate (.7 – 1.7 m/m2), high (1.7 – 4.7 m/m2), or extremely high (4.7+ m/m2). About 51 percent of the Interior Columbia Basin supports road densities estimated at the moderate or above level (Quigley et al. 1996). Open road/trail densities in the analysis area are 8 miles per square mile, some of these are on steep ground not accessible by pickup trucks but are used by off road vehicles. There are a total of 31 miles of roads/trails that are open in the analysis area. This reduces the habitat security and increases the potential for poaching. Many of the roads are used to access existing mining claims.

**EXISTING CONDITIONS SUMMARY (TE&S WILDLIFE)**

The following Special Status species were evaluated but were considered to not have potential habitat in the analysis areas: Canada Lynx, Washington Ground Squirrel, Oregon Spotted Frog, Upland Sandpiper, Western Pond Turtle, Northern Leopard Frog, Cope's Giant Salamander, Tricolored Blackbird, Burrowing Owl, Pygmy Rabbit, Western Sage Grouse, Spotted Bat, Brazilian Free-Tailed Bat, Ferruginous Hawk, Columbia Sharp-tailed Grouse, Yellow-Billed Cuckoo, and Streaked Horned Lark, Painted Turtle, Three-toed Woodpecker, Northern Bald Eagle, Peregrine Falcon.

The following Special Status species have potential habitat and will be discussed in detail in the wildlife specialist report:
Townsend's big eared bat (Corynorhinus townsendii): Sensitive (BLM OR)
Northern Goshawk (Accipiter gentilis): Sensitive (BLM OR)

Northern Pygmy Owl (Glaucidium gnoma): Sensitive (BLM OR)
Flammulated Owl (Otus flammeolus): Sensitive (BLM OR)
White-headed Woodpecker (Picoides albolarvatus): Sensitive (BLM OR)
Black-backed Woodpecker (Picoides arcticus): Sensitive (BLM OR)
Pygmy Nuthatch (Sitta pygmaea): Sensitive (BLM OR)
Fisher (Martes pennanti): Sensitive (BLM OR)

## EXISTING CONDITIONS (Detailed)

Many of the habitat descriptions and wildlife species associations in this report were developed through extensive use of the publication "Wildlife-Habitat Relationships in Oregon and Washington" (Johnson and O'Neil, 2001) and the "Matrixes for Wildlife-Habitat Relationships in Oregon and Washington CD-ROM" (O'Neil et al. 2001). The descriptive habitat/species matrixes in these references were developed using some 60,000 records of data, 100,000 pieces of literature, and panels of fifteen groups of expert specialists.

There are four major wildlife habitat types found in the LCM project area. Included are:

5) Ponderosa Pine Forest and Woodlands
6) Eastside (Interior) Mixed Conifer Forest
7) Western Juniper and Mountain Mahogany Woodlands
8) Eastside (Interior) Riparian-Wetlands

Habitat functions in the LCM area have been modified from historic conditions. Practices such as timber harvest, fire suppression, grazing, mining, and roading have changed the quantity and quality of wildlife habitat for many species.

### Ponderosa Pine Forest and Woodlands

Ponderosa Pine Forest and Woodlands comprise the majority of the wildlife habitat present in the project area. This woodland habitat typifies the lower treeline zone forming transitions with Eastside Mixed Conifer Forest and Western Juniper and Mountain Mahogany Woodland, Shrub-steppe, Eastside Grassland, or Agriculture habitats. Douglas-fir-ponderosa pine woodlands are found near or within the Eastside Mixed Conifer Forest habitat. This habitat is typically a woodland or savanna with tree canopy coverage of 10- 60%, although closed-canopy stands are possible. The tree layer is usually composed of widely spaced large conifer trees. Many stands tend towards a multilayered condition with encroaching conifer regeneration. The undergrowth may include dense stands of shrubs or, more often, be dominated by grasses, sedges, or forbs. Shrub-steppe shrubs may be prominent in some stands and create a distinct tree-shrub-sparse-grassland habitat.

Ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) are the most common evergreen trees in this habitat. The deciduous conifer, western larch (*Larix occidentalis*), can be a co-dominant with the evergreen conifers in the Blue Mountains of Oregon, but seldom as a canopy dominant. Grand fir (*Abies grandis*) may be frequent in the undergrowth on more productive sites giving stands a multilayer structure. In rare instances, grand fir can be co-dominant in the upper canopy. The undergrowth can include dense stands of shrubs or, more often, be dominated by grasses, sedges, and/or forbs. Some Douglas-fir and ponderosa pine stands have a tall to medium-tall deciduous shrub layer of mallowleaf ninebark (*Physocarpus malvaceus*) or common snowberry (*Symphoricarpos*

*albus*). Grand fir seedlings or saplings may be present in the undergrowth. Undergrowth is generally dominated by herbaceous species, especially graminoids..

Fire plays an important role in creating vegetation structure and composition in this habitat. Most of the habitat has experienced frequent low-severity fires that maintained woodland or savanna conditions. A mean fire interval of 20 years for ponderosa pine is the shortest of the vegetation types listed by Barrett et al. (1997). Soil drought plays a role in maintaining an open tree canopy in part of this dry woodland habitat. This habitat is climax on sites near the dry limits of each of the dominant conifer species and is more seral as the environment becomes more favorable for tree growth. Open seral stands are gradually replaced by more closed shade-tolerant climax stands.

Pre-1900, this habitat was mostly open and park like with relatively few undergrowth trees. Currently, much of this habitat has a younger tree cohort of more shade-tolerant species that gives the habitat a more closed, multilayered canopy. For example, this habitat includes previously natural fire-maintained stands in which grand fir can eventually become the canopy dominant. Fire suppression has lead to a buildup of fuels that in turn increase the likelihood of stand-replacing fires.

There are 13 amphibians, 21 reptiles, 131 birds, and 67 mammals, for a total of 232 vertebrate wildlife species that are associated with this habitat type. Many wildlife species that inhabit Eastside (interior) forests and woodlands might be considered "associates" of this habitat type, however they are not often considered "obligates". Thus, the distributional aspects of any Eastside (interior) forest and woodland habitat types are not generally considered limiting for wildlife.

**Eastside (Interior) Mixed Conifer Forest**

This habitat makes up most of the continuous montane forests of the inland Pacific Northwest. It is located between the subalpine portions of the Montane Mixed Conifer Forest habitat in eastern Oregon and Washington and lower tree line Ponderosa Pine and Forest and Woodlands.

Eastside Mixed Conifer habitats are montane forests and woodlands. Stand canopy structure is generally diverse, although single-layer forest canopies are currently more common than multilayered forests with snags and large woody debris. The tree layer varies from closed forests to more open-canopy forests or woodlands. This habitat may include very open stands. The undergrowth is complex and diverse. Tall shrubs, low shrubs, forbs or any combination may dominate stands. Deciduous shrubs typify shrub layers. Prolonged canopy closure may lead to development of a sparsely vegetated undergrowth.

This habitat contains a wide array of tree species and stand dominance patterns. Douglas-fir (*Pseudotsuga menziesii*) is the most common tree species in this habitat. It is almost always present and dominates or co-dominates most overstories. Lower elevations or drier sites may have ponderosa pine (*Pinus ponderosa*) as a co-dominant with Douglas-fir in the overstory and often have other shade-tolerant tree species growing in the undergrowth

Fires were probably of moderate frequency (30-100 years) in presettlement times. Inland Pacific Northwest Douglas-fir and western larch forests have a mean fire interval of 52 years (Barrett et al. 1997). Typically, stand-replacement fire-return intervals are 150-500 years with moderate severity-fire intervals of 50-100 years. Specific fire influences vary with site characteristics. Generally, wetter sites

burn less frequently and stands are older with more western hemlock and western redcedar than drier sites. Many sites dominated by Douglas-fir and ponderosa pine, which were formerly maintained by wildfire, may now be dominated by grand fir (a fire sensitive, shade-tolerant species).

Successional relationships of this type reflect complex interrelationships between site potential, plant species characteristics, and disturbance regime (Zack and Morgan 1994). Generally, early seral forests of shade-intolerant trees (western larch, western white pine, ponderosa pine, Douglas-fir) or tolerant trees (grand fir, western redcedar, western hemlock) develop some 50 years following disturbance. This stage is preceded by forb- or shrub- dominated communities. These early stage mosaics are maintained on ridges and drier topographic positions by frequent fires. Early seral forest develops into mid-seral habitat of large trees during the next 50-100 years. Stand replacing fires recycle this stage back to early seral stages over most of the landscape. Without high-severity fires, a late-seral condition develops either single-layer or multilayer structure during the next 100-200 years. These structures are typical of cool bottomlands that usually only experience low-intensity fires.

This habitat has been most affected by timber harvesting and fire suppression. Timber harvesting has focused on large shade-intolerant species in mid- and late-seral forests, leaving shade-tolerant species. Fire suppression enforces those logging priorities by promoting less fire-resistant, shade-intolerant trees. The resultant stands at all seral stages tend to lack snags, have high tree density, and are composed of smaller and more shade-tolerant trees. Mid-seral forest structure is currently 70% more abundant than in historical, native systems (Quigley and Arbelbide 1997). Late-seral forests of shade-intolerant species are now essentially absent. Early-seral forest abundance is similar to that found historically but lacks snags and other legacy features.

There are 12 amphibians, 11 reptiles, 116 birds, and 80 mammals, for a total of 219 vertebrate wildlife species that are associated with this habitat type. Many wildlife species that inhabit Eastside (interior) forests and woodlands might be considered "associates" of this habitat type, however they are not often considered "obligates". Thus, the distributional aspects of any Eastside (interior) forest and woodland habitat types are not generally considered limiting for wildlife.

**Western Juniper and Mountain Mahogany Woodlands**

This habitat reflects a transition between Ponderosa Pine Forest and Woodlands and Shrub-steppe. Western juniper generally occurs on higher topography, whereas the shrub communities are more common in depressions or steep slopes with bunchgrass undergrowth. Mountain-mahogany can occur in isolated, pure patches that are often very dense.

This habitat is made up of savannas, woodlands, or open forests with 10-60% canopy cover. The tallest layer is composed of short (6.6-40 ft [2-12 m] tall) evergreen trees. Dominant plants may assume a tall-shrub growth form on some sites. The short trees appear in a mosaic pattern with areas of low or medium-tall (usually evergreen) shrubs alternating with areas of tree layers and widely spaced low or medium-tall shrubs. The herbaceous layer is usually composed of short or medium tall bunchgrass or, rarely, a rhizomatous grass-forb undergrowth. These vegetated areas can be interspersed with rimrock or scree. A well-developed cryptogam layer often covers the ground, although bare rock can make up much of the ground cover.

Western juniper and/or mountain mahogany dominate these woodlands either with bunchgrass or shrubsteppe undergrowth. Western juniper (*Juniperus occidentalis*) is the most common dominant tree in these woodlands. Part of this habitat will have curl-leaf mountain mahogany (*Cercocarpus ledifolius*) as the only dominant tall shrub or small tree. Mahogany may be co-dominant with western juniper. Ponderosa pine (*Pinus ponderosa*) can grow in this habitat and in some rare instances may be an important part of the canopy.

The most common shrubs in this habitat are basin, Wyoming, or mountain big sagebrush (*Artemisia tridentata* ssp. *tridentata,* ssp. *wyomingensis,* and ssp. *vaseyana*) and/or bitterbrush (*Purshia tridentata*). They usually provide significant cover in juniper stands. Low or stiff sagebrush (*Artemisia arbuscula* or *A. rigida*) are dominant dwarf shrubs in some juniper stands. Mountain big sagebrush appears most commonly with mountain mahogany and mountain mahogany mixed with juniper. Snowbank shrubland patches in mountain mahogany woodlands are composed of mountain big sagebrush with bitter cherry (*Prunus emarginata*), quaking aspen (*Populus tremuloides*), and serviceberry (*Amelanchier alnifolia*). Shorter shrubs such as mountain snowberry (*Symphoricarpos oreophilus*) or creeping Oregongrape (*Mahonia repens*) can be dominant in the undergrowth. Rabbitbrush (*Chrysothamnus nauseosus* and *C. viscidiflorus*) will increase with grazing.

Both mountain mahogany and western juniper are fire intolerant. Under natural high-frequency fire regimes both species formed savannas or occurred as isolated patches on fire-resistant sites in shrub-steppe or steppe habitat. Western juniper is considered a topoedaphic climax tree in a number of sagebrush-grassland, shrub-steppe, and drier conifer sites. It is an increaser in many earlier seral communities in these zones and invades without fires. Most trees >13 ft (4 m) tall can survive low-intensity fires. The historic fire regime of mountain mahogany communities varies with community type and structure. The fire-return interval for mountain mahogany (along the Salmon River in Idaho) was 13-22 years until the early 1900's and has increased ever since. Mountain mahogany can live to 1,350 years in western and central Nevada. Some old-growth mountain mahogany stands avoid fire by growing on extremely rocky sites.

Juniper invades shrub-steppe and steppe and reduces undergrowth productivity. Although slow seed dispersal delays recovery time, western juniper can regain dominance in 30-50 years following fire. A fire-return interval of 30-50 years typically arrests juniper invasion. The successional role of curl-leaf mountain mahogany varies with community type. Mountain brush communities where curl-leaf mountain mahogany is either dominant or co-dominant are generally stable and successional rates are slow.

Over the past 150 years, with fire suppression, overgrazing, and changing climatic factors, western juniper has increased its range into adjacent shrub-steppe, grasslands, and savannas. Increased density of juniper and reduced fine fuels from an interaction of grazing and shading result in high severity fires that eliminate woody plants and promote herbaceous cover, primarily annual grasses. Diverse mosses and lichens occur on the ground in this type if it has not been too disturbed by grazing. Excessive grazing will decrease bunchgrasses and increase exotic annual grasses plus various native and exotic forbs. Animals seeking shade under trees decrease or eliminate bunchgrasses and contribute to increasing cheatgrass cover.

This habitat is dominated by fire-sensitive species, and therefore, the range of western juniper and mountain mahogany has expanded because of an interaction of livestock grazing and fire suppression.

Quigley and Arbelbide (1997) concluded that in the Inland Pacific Northwest, Juniper/Sagebrush, Juniper Woodlands, and Mountain Mahogany cover types now are significantly greater in extent than before 1900. Although it covers more area, this habitat is generally in degraded condition because of increased exotic plants and decreased native bunchgrasses.

There are 7 amphibians, 16 reptiles, 101 birds, and 43 mammals, for a total of 167 vertebrate wildlife species that are associated with this habitat type.

**Eastside (Interior) Riparian-Wetlands**

Eastside riparian habitats occur along streams, seeps, and lakes within the Eastside Mixed Conifer Forest, Ponderosa Pine Forest and Woodlands, Western Juniper and Mountain Mahogany Woodlands, and part of the Shrub-steppe habitat. This habitat may be described as occupying warm montane and adjacent valley and plain riparian environments.

The Eastside riparian and wetland habitat contains shrublands, woodlands, and forest communities. Stands are closed to open canopies and often multilayered. A typical riparian habitat would be a mosaic of forest, woodland, and shrubland patches along a stream course. The tree layer can be dominated by broadleaf, conifer, or mixed canopies. Tall shrub layers, with and without trees, are deciduous and often nearly completely closed thickets. These woody riparian habitats have an undergrowth of low shrubs or dense patches of grasses, sedges, or forbs. Tall shrub communities (20-98 ft [6-30 m], occasionally tall enough to be considered woodlands or forests) can be interspersed with sedge meadows or moist, forb-rich grasslands. Intermittently flooded riparian habitat has ground cover composed of steppe grasses and forbs. Rocks and boulders may be a prominent feature in this habitat.

Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), quaking aspen (*P. tremuloides*), white alder (*Alnus rhombifolia*), and peachleaf willow (*Salix amygdaloides*) are dominant and characteristic tall deciduous trees. Water birch (*B. occidentalis*), shining willow (*Salix lucida* ssp. *caudata*) and, rarely, mountain alder (*Alnus incana*) are co-dominant to dominant mid-size deciduous trees. Each can be the sole dominant in stands. Conifers can occur in this habitat, rarely in abundance, more often as individual trees. The exception is ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) that characterize a conifer-riparian habitat in portions of the shrub-steppe zones.

A wide variety of shrubs are found in association with forest/woodland versions of this habitat. Red-osier dogwood (*Cornus sericea*), mountain alder, gooseberry (*Ribes* spp.), rose (*Rosa* spp.), common snowberry (*Symphoricarpos albus*) and Drummonds willow (*Salix drummondii*) are important shrubs in this habitat. Bog birch (*B. nana*) and Douglas spiraea (*Spiraea douglasii*) can occur in wetter stands. Red-osier dogwood and common snowberry are shade-tolerant and dominate stand interiors, while these and other shrubs occur along forest or woodland edges and openings. Mountain alder is frequently a prominent shrub, especially at middle elevations. Tall shrubs (or small trees) often growing under or with white alder include chokecherry (*Prunus virginiana*), water birch, shining willow, and netleaf hackberry (*Celtis reticulata*).

Shrub-dominated communities contain most of the species associated with tree communities. Willow species (*Salix bebbiana, S. boothii, S. exigua, S geyeriana,* or *S. lemmonii*) dominate many sites.

Mountain alder can be dominant and is at least codominant at many sites. Chokecherry, water birch, serviceberry (*Amelanchier alnifolia*), black hawthorn (*Crataegus douglasii*), and red-osier dogwood can also be codominant to dominant. Shorter shrubs, Woods rose, spiraea, snowberry and gooseberry are usually present in the undergrowth.

This habitat is tightly associated with stream dynamics and hydrology. Flood cycles occur within 20-30 years in most riparian shrublands although flood regimes vary among stream types. Fires recur typically every 25-50 years but fire can be nearly absent in colder regions or on topographically protected streams. Rafted ice and logs in freshets may cause considerable damage to tree boles in mountain habitats. Beavers crop younger cottonwood and willows and frequently dam side channels in these stands. These forests and woodlands require various flooding regimes and specific substrate conditions for reestablishment.

Riparian vegetation undergoes "typical" stand development that is strongly controlled by the site's initial conditions following flooding and shifts in hydrology. The initial condition of any hydrogeomorphic surface is a sum of the plants that survived the disturbance, plants that can get to the site, and the amount of unoccupied habitat available for invasions. Subsequent or repeated floods or other influences on the initial vegetation selects species that can survive or grow in particular life forms. A typical woody riparian habitat dynamic is the invasion of woody and herbaceous plants onto a new alluvial bar away from the main channel. If the bar is not scoured in 20 years, a tall shrub and small deciduous tree stand will develop. Approximately 30 years without disturbance or change in hydrology will allow trees to overtop shrubs and form woodland. Another 50 years without disturbance will allow conifers to invade and in another 50 years a mixed hardwood-conifer stand will develop. Many deciduous tall shrubs and trees cannot be invaded by conifers. Each stage can be reinitiated, held in place, or shunted into different vegetation by changes in stream or wetland hydrology, fire, grazing, or an interaction of those factors.

Riparian areas are the most critical wildlife habitats in the analysis area. Wildlife use streamsides as "connectors", or travel lanes between forested habitats as well as for maternity sites, and safe zones. Large mammals, furbearers, and predators use riparian zones as travel corridors to and from summer and winter ranges and between feeding, resting, breeding, brooding, and rearing habitats (Brown, 1985). Shrub conditions in riparian areas were especially critical due to the diversity of species that utilized these areas. Riparian areas in the watershed tend to have higher numbers of snags. These components in association with higher canopy closure levels allow riparian areas to function as connective (travel) habitat for a variety of species.

The following activities have altered riparian conditions: elimination of beaver, alteration of the hydrological function of streams, removal of natural fire, timber harvest, roading, dispersed recreation and camping, excessive grazing of cattle, and other man caused impacts. These alterations have affected the ability of the area to support many of the plant species and thus habitats that once occurred in the riparian zones. No research exists indicating road densities within riparian areas at which wildlife will still be able to effectively exploit those habitats. Due to the importance and sensitivity of activities that wildlife used riparian areas for, it is felt that very low road densities within the riparian zones should exist.

Up to 80% of vertebrate species in the arid West use western riparian habitats at some stage of their lives. The high density and diversity of wildlife within these habitats result from the availability of water and prey items, and from high vegetative density, diversity, and structure (Krueper 1993).

There are 14 amphibians, 10 reptiles, 163 birds, and 79 mammals, for a total of 266 vertebrate wildlife species that are associated with this habitat type.

**Snags and Downed Logs**

John Day RMP sates, "Leave appropriate snags and/or large dead trees for wildlife, as per current BLM Snag Management Policy Guidelines and Agriculture Handbook No. 553 (USDA 1979, In USDI RMP – Record of Decision 1985).

Rose et al. (2001) emphasize that down wood, snags, and live trees with decay serve vital roles in meeting the life history needs of wildlife species in Oregon and Washington. Interactions among wildlife, other organisms, and decaying wood substrates are essential to ecosystem processes and functions.

In the 4 Eastside (interior) forest and woodland habitat types, 77 species of vertebrates associate with snag substrates during some part of the annual cycle, including 2 amphibians, 51 birds, and 24 mammals, which use specific snag characteristics for diverse purposes. Primary cavity excavators include 15 species (2 chickadees, 3 nuthatches, 9 woodpeckers, and black bear) (Sallabanks et al. 2001).

Sixty-eight species of wildlife found in Eastside (interior) forests and woodlands have correlations with down wood, including 6 amphibians, 5 reptiles, 13 birds, and 44 mammals (Sallabanks et al. 2001). Bull et al. (1997) provide details of use of down wood by numerous wildlife species in the interior Columbia River Basin. Some species, such as the pileated woodpecker, in the Blue Mountains of northeastern Oregon, frequently forage on down wood for carpenter ants.

Historically snag and down log levels occurred in differing abundance's across the landscape. Factors effecting the distribution and levels of snags were based ultimately on the location in the watershed, the amounts of precipitation, and the disturbance factors at work at any given time. Just as these factors influenced the seral structural conditions of plant communities across the landscape they also affected the number and distribution of snags and down logs. The processes that lead to standing and down dead trees can be lumped into two main categories; those that create large fairly contiguous areas of dead trees and those that kill individual or small groups of trees. The following categorical lists will identify some of the processes that created snags and down logs. It is important to remember that any number or combination of factors may take place to create tree mortality.

Broad scale mortality: fire, insect epidemics, wind, volcanoes, flooding

Individual or small group mortality: fire, endemic insect activity, root disease, mistle toe, inter and intra specific competition, wind, animal damage, flooding, etc.

Stands that went through broad scale mortality events had large amounts of snags and down logs for a period of time. These conditions persisted and provided unique habitat conditions of optimal snag and log levels. These conditions occurred historically across the landscape and populations of dead wood dependent species thrived for a period of time. Depending on the site and climatelogical factors these conditions could persist until another stand developed in which case the relics of the previous stand add to the dynamics of the new stand, or fire may have removed some or all of the dead wood components in a given area.

It is important to recognize that both the broad scale mortality, individual tree, and small group mortality occurred throughout watersheds and landscapes at various scales, time frames, and locations. Both types of mortality create habitat conditions that have been exploited by various species. This would require recognition of the fact that for recruitment of live trees greater than 21" dbh may take 100 – 200 years and the loss of down logs due to the fire would be replenished by snags falling. In many areas legal and illegal cutting of snags and down logs has reduced snag densities within 200 feet of roads. The east half of the analysis area is located in a heavily roaded area with high potential for impacts from woodcutters. The west half of the analysis area is a remote area with lower potential for impacts from woodcutters.

On the eastside in particular, current levels of decaying wood may be elevated above historical conditions due to fire suppression and increased mortality, and may be depleted below historical levels in local areas burned by intense fire or subjected to repeated salvage and firewood cutting (Rose et el. 2001).

Table 1 includes recommendations for snag and down log densities based on literature review (ICBMP and Rose et al. 2001), and are given to provide some basic framework to the project layout and design. There are many questions that remain regarding the most desirable density and spatial distribution of snags and down wood for wildlife, and no specific recommendations by habitat type for each of these components were found. Since the publications of Thomas et al. (1979) and Brown (1985) new research has indicated that more snags and down large wood are needed to provide for the needs of fish, wildlife, and other ecosystem functions than was previously recommended by forest management guidelines in Washington and Oregon (Rose et al. 2001). It is recognized that because of the fuels reduction nature of this project close to the urban interface, the recommendations for down logs will more than likely not be met. A return to a more natural disturbance regime would result in the loss of dead wood that has developed from fire exclusion (Sallabanks et al. 2001). However, these recommendations are included to show the importance of this habitat component to wildlife species, and the desire to retain down logs whenever possible.

Table 1 suggests an even distribution of snags and down wood across the project area. However, clumping of snags and down wood may be a natural pattern, and clumps may be selected by some species, so providing only even distributions may be insufficient to meet all species needs (Rose et al. 2001). Managers can take opportunistic advantage of site-specific occurrences of snags and down wood without having to match a particular spatial distribution pattern of clumps. This offers managers broad flexibility to provide varying local densities of snags and down wood across the ground, within and among stands. Managers must also consider the temporal dimension to decaying wood, to ensure that sufficient snag and down wood densities are provided through time (Rose et al. 2001). It is

therefore suggested that the recommendations provided be averaged across the landscape while providing some areas of clumps with higher densities of snags and down wood.

Table 1. Recommendations for Snag and Down Log Densities for the LCM Project

| | Habitat Type | | | |
|---|---|---|---|---|
| | Ponderosa Pine Forest and Woodlands | | Eastside (Interior) Mixed Conifer Forest | |
| | 10-20 " dbh | >20" dbh | 10-20 " dbh | >20" dbh |
| # snags / acre | 4 | 1 | 6 | 1.5 |
| Linear feet of down logs / acre | 144 | | 300 | |

**Big Game**

Rocky Mountain elk and mule deer are species of special interest to public land users and, as such, are species with emphases in the RMP. The analysis area is located in the Murderer's Creek Wildlife Management Unit. Both are present and use the analysis area for rutting, calving, and fawning. Approximately 85% of the analysis area is considered to be crucial mule deer winter range.

The high road densities associated with the analysis area is reducing habitat security. The Interior Columbia Basin Review stratified road density levels as follows: none to very low (0 - .1 m/m2), low (.1 - .7 m/m2), moderate (.7 – 1.7 m/m2), high (1.7 – 4.7 m/m2), or extremely high (4.7+ m/m2). About 51 percent of the Interior Columbia Basin supports road densities estimated at the moderate or above level (Quigley and others 1996). Open road/trail densities in the analysis area are 8 miles per square mile, some of these are on steep ground not accessible by pickup trucks but are used by off road vehicles. There are a total of 31 miles of roads/trails that are open in the analysis area. This reduces the habitat security and increases the potential for poaching. Many of the roads are used to access existing mining claims.

Dense cover and steep topography can increase the level of security and thus increase potential for use even in areas with higher road densities. Marginal thermal cover is defined as areas with canopy closure between 40 – 70% with optimal thermal cover being greater than 70%. Although not directly related, the denser the canopy cover the greater potential to provide screening (hiding cover) on distant slopes and greater canopy covers indicate multi strata canopy that provides ground level screening. Public lands in this area receive heavy recreational use and hunting pressure.

**TE&S Wildlife**

The following Special Status species were evaluated but were considered to not have potential habitat in the analysis areas: Canada Lynx, Washington Ground Squirrel, Oregon Spotted Frog, Upland Sandpiper, Western Pond Turtle, Northern Leopard Frog, Cope's Giant Salamander, Tricolored Blackbird, Burrowing Owl, Pygmy Rabbit, Western Sage Grouse, Spotted Bat, Brazilian Free-Tailed Bat, Ferruginous Hawk, Columbia Sharp-tailed Grouse, Yellow-Billed Cuckoo, and Streaked Horned Lark, Painted Turtle, Three-toed Woodpecker, Northern Bald Eagle, Peregrine Falcon.

The following Special Status species have potential habitat and will be discussed in detail:

Townsend's big eared bat (Corynorhinus townsendii): Sensitive (BLM OR)
Northern Goshawk (Accipiter gentilis): Sensitive (BLM OR)
Northern Pygmy Owl (Glaucidium gnoma): Sensitive (BLM OR)
Flammulated Owl (Otus flammeolus): Sensitive (BLM OR)
White-headed Woodpecker (Picoides albolarvatus): Sensitive (BLM OR)
Black-backed Woodpecker (Picoides arcticus): Sensitive (BLM OR)
Pygmy Nuthatch (Sitta pygmaea): Sensitive (BLM OR)
Fisher (Martes pennanti): Sensitive (BLM OR)

*Bureau Special Status Species:*

Townsend's Big Eared Bat (Plecotus townsendii): Maternity and hibernacula sites are associated with caves, mines, lava tubes, and buildings. Rimrock, cliffs, bridges, boulder fields, and bark of large trees have the potential to be used as day roosts. The analysis area has no known maternity roost or hibernacula sites but potential is high due to caves and mining activity. Openings in timbered areas with standing water association are prime foraging opportunities for Townsend's big-eared bats. Bats are known to travel long distances to foraging sites, so the analysis area has the potential to be used as a foraging area. Formal surveys have not been conducted.

Northern Goshawk (Accipiter gentilis): Goshawk nesting home ranges cover approximately 420 acres (includes the nest site, foraging area, and post-fledging family area) (Reynolds et al. 1991). Goshawks prefer open stands for foraging activities; however, for nesting they require canopy closures for protection for the weather and other raptor species. Goshawk nesting habitat is generally found with ¼ mile of a spring or smaller order stream. These sites provide higher canopy cover for nesting due to higher growth potential.

There were two juvenile goshawks sighted in the analysis area in summer 2002 surveys. It is assumed that there is a goshawk nest within the analysis area. The 1998 interim management direction provided by the BLM Oregon State Office (IM-OR-98-012); Northern Goshawk Management Guidelines, will be used when applying treatment prescriptions.

***Northern Goshawk Management Prescriptions; provided in IM-OR-98-012:***

Our objectives and prescriptions for the management of northern goshawks will be to: (1) identify active nest sites, (2) protect the active nest sites from adverse activities, and (3) establish a post-fledgling family area (PFFA) around each nest site.

The following interim management and prescriptions will be applied to northern goshawk habitat:

1. Survey for the presence of nesting goshawks in suitable goshawk habitat for all major management actions (e.g., timber sales) prior to the implementation of management activities. Implementation is the date a Record of Decision is signed. Two years of surveys are recommended for all new timber sales.

2. Ensure that the most recent version of the E-4 Special Provision issued May 10, 1996, in

Instruction Memorandum No. OR-96-78 is included in all new sale contracts.

3. Active and historically used (i.e., alternate nest sites used in the past five years) nest sites and the surrounding 400-acre PFFA shall be afforded the following management recommendations:

   a. At a minimum, 30 acres of the most suitable nesting habitat surrounding the nest site shall be deferred from harvest. The 30 acres should include known alternate nest sites and plucking posts and should be blocky or circular in shape. Biologists should use the best available professional knowledge of the birds' habitat use and of the available habitat. If operating under an existing management plan that specifies greater protection, then the more stringent management prescriptions shall prevail.

   b. A 400-acre PFFA shall be designated around each active nest site and be comprised of the best available habitat. While harvesting activities can occur, a minimum of sixty percent (if it currently exists) of the PFFA shall be managed as mature and old growth/old forest seral stages (approximately 80 years of age and older and hereafter referred to as late successional). Harvest of late-successional tree/stands may occur if based upon a risk assessment and a determination of imminent threat to the viability of the habitat. An example would be the creation of a fire break.

   c. Within the PFFA, forest health projects and timber sale activities should be designed to promote retention of late-successional stands where they exist. This may include the thinning of over-dense late seral stage stands (approximately 40-80 years) which may or may not have a late-successional component. In early and late seral stands, activities will be designed to promote forest health and the creation of late-successional conditions.

   d. All projects must be designed to avoid or minimize disturbance during the bonding and nesting period. A seasonal restriction precluding all disturbance from April 1 through August 30 is recommended.

Northern Pygmy Owl (Glaucidium gnoma): The Northern Pygmy-owl is found in mixed coniferous-deciduous forests, riparian woodlands, and drier woodlands including ponderosa pine. Pygmy-owls use abandoned woodpecker holes for nesting and hunt in open areas within the forest matrix (Csuti et al. 2001). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Flammulated Owl (Otus flammeolus): Flammulated owl utilizes open forests that have a ponderosa pine component, but has been found in Douglas-fir requiring fairly large trees for roosting with grassland or meadows in the area. Flammulated owls nest in abandoned woodpecker holes or natural tree cavities (Csuti et al. 2001). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

White-headed Woodpecker (Picoides albolarvatus): White-headed woodpeckers are closely associated with ponderosa pine and mixed conifer forest with relatively large trees and snags characteristic of older forests (Csuti et al. 2001). The low numbers of large diameter ponderosa pine trees reduces the likelihood the analysis area is being used by white-headed woodpeckers. The project area does have marginal reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Black-backed Woodpecker (Picoides arcticus): Black-backed woodpeckers utilize older forest stands of lodgepole pine, ponderosa pine, and western larch for nesting (Csuti et al. 2001). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Pygmy Nuthatch (Sitta pygmaea): In Oregon the pygmy nuthatch utilizes mature ponderosa pine woodlands with less than 70% canopy closure and adequate large (average 20" dbh) ponderosa pine snags (Csuti et al. 2001). The project area contains habitat with the potential for reproductive and foraging habitat. Formal surveys have not been done. No sightings have been recorded in the analysis area.

Pacific Fisher (Martes pennanti): Fisher primarily use mature, closed canopy coniferous forests with some deciduous component, frequently along riparian corridors. The fisher is an opportunistic carnivore whose diet includes small rodents, rabbits, squirrels, porcupines, amphibians, reptiles, and birds and their eggs (Csuti et al., 2001). The analysis area is not of sufficient size to provide a home range, but has the potential to be used as incidental foraging or dispersing habitat. Winter surveys utilizing bait stations, track plates, track surveys, and cameras have been used on the surrounding Ochoco and Malhuer N.F.s with no fisher being identified. The fisher is very rare in Oregon (Csuti et al. 2001).

## ALTERNATIVES COMPARISON (EFFECTS)

### General Discussion:

When comparing effects of man induced change it is important to have a basic understanding of the natural processes and effects. Wildlife populations have and will continue to be affected mainly by the local climate, vegetation, topography, competition, predation, and disturbance factors. The effects of man induced change related to the silvicultural and other activities proposed in the alternatives will be measured against each other. Proposed actions associated with the alternatives will be viewed in the context of their potential for effects to the process and function related to wildlife habitat.

Wildlife habitats that are balanced, not to the reduction of any one species, will be better able to adjust to partial habitat reductions due to wildfires, windstorms, human activities, drought, flood, etc.. The ability for broad scale resilience will increase with the number and size of watersheds approached in this manner.

A thorough literature search was conducted in an attempt to correlate canopy cover percent to basal area for habitat types, and with one exception, none was found. Dealy (1985) did an estimate of tree

basal area as an index of thermal cover for elk. While the information helpful, the regression shown in this paper applied to unthinned stands. An on-site examination of basal area and correlated canopy closure (based on satellite imagery) for treated stands in the Ochoco National Forest was done to help in making canopy closure estimates. For analytical purposes in determining effects, the amount of canopy cover was estimated and correlated to basal area as follows:

| Basal Area ($ft^2$ per acre) | Estimated % Canopy Closure | Structural Definition |
|---|---|---|
| 30-60 | 10-39 | Open |
| 60-120 | 40-69 | Moderate |
| 120+ | 70-100 | Closed |

Data queries from O'Neil et al. (2001) are used to determine the number of species associated with different forest structural conditions.

The forest structural conditions are based upon the following attributes:
1) tree size (dbh);
2) percent canopy cover (or percent grass/forb cover); and,
3) number of canopy layers.

These attributes have the following values:

Tree Size (dbh)

| | | |
|---|---|---|
| *Shrub/Seedling* | <1" | <2.5 cm |
| *Sapling/Pole* | 1-9" | 2.5-24 cm |
| *Small Tree* | 10-14" | 25-37 cm |
| *Medium Tree* | 15-19" | 38-49 cm |
| *Large Tree* | 20-29" | 50-75 cm |
| *Giant Tree* | ≥ 30" | ≥ 76 cm |

Percent Canopy Cover

| | |
|---|---|
| *Open* | 10-39% |
| *Moderate* | 40-69% |
| *Closed* | 70-100% |

Number of Canopy Layers

| | |
|---|---|
| *Single Story* | 1 stratum |
| *Multi-story* | 2 or more strata |

The previous attributes have been combined into the following structural conditions for this analysis as described by O'Neil et al. (2001):

Sapling/Pole - Open

The canopy is open enough that understory vegetation may be abundant. Remnant trees (trees remaining from the previous stand) can provide <10% canopy cover. There is 10-39% cover of sapling and pole sized trees. Tree size is 1"-9" dbh, and there is a single canopy stratum.

Sapling/Pole - Moderate

Understory development is hampered by available light and moisture. Remnant trees (trees remaining from the previous stand) can provide <10% canopy cover. There is 40-69% cover of sapling and pole sized trees. Tree size is 1"-9" dbh, and there is a single canopy stratum.

Sapling/Pole - Closed

The understory is depauperate or absent. Remnant trees (trees remaining from the previous stand) can provide <10% canopy cover. There is > 70% cover of sapling and pole sized trees. Tree size is 1"- 9" dbh and there is a single canopy stratum.

Small Tree - Multi-story - Open

These stands have an overstory of small trees with a distinct subcanopy of saplings and/or poles. Scattered larger trees may be present but make up less than 10% canopy cover. Grass/forb or shrub understory may be present. There is 10-39% total canopy cover dominated by small trees, at least 10% or more canopy cover of 1 or more other smaller tree sizes. Tree size is 10"-14" dbh, and there are two or more canopy strata.

Small Tree - Multi-story - Moderate

These stands have an overstory of small trees with a distinct subcanopy of saplings and/or poles. Scattered larger trees may be present but make up less than 10% canopy cover. Grass/forb or shrub understory may be present, but is probably limited. There is 40-69% total canopy cover dominated by small trees, at least 10% or more canopy cover of 1 or more other smaller tree sizes. Tree size is 10"-14" dbh, and there are two or more canopy strata.

Small Tree - Multi-story - Closed

These stands have an overstory of small trees with a distinct subcanopy of saplings and/or poles. Scattered larger trees may be present but make up less than 10% canopy cover. Grass/forb or shrub understory extremely limited or absent. There is >70% total canopy cover dominated by small trees, at least 10% or more canopy cover of 1 or more other smaller tree sizes. Tree size is 10-14" dbh, and there are two or more canopy strata.

Medium Tree - Multi-story- Open

These stands have an overstory of medium trees with a distinct subcanopy of smaller trees. Scattered larger trees may be present but make up less than 10% canopy cover. Grass/forb or shrub understory may be present, but is probably limited. There is 10-39% total canopy cover dominated by medium trees, at least 10% or more canopy cover of 1 or more smaller tree sizes. Tree size is 15"-19" dbh, and there are two or more canopy strata.

Medium Tree - Multi-story - Moderate

These stands have an overstory of medium trees with a distinct subcanopy of smaller trees. Scattered larger trees may be present but make up less than 10% canopy cover. Grass/forb or shrub understory may be present, but is probably limited. There is 40-69% total canopy cover dominated by medium trees, at least 10% or more canopy cover of 1 or more smaller tree sizes. Tree size is 15"-19" dbh, and there are two or more canopy strata.

Medium Tree - Multi-story - Closed

These stands have an overstory of medium trees with a distinct subcanopy of smaller trees. Scattered larger trees may be present but make up less than 10% canopy cover. Grass/forb understory may be present, but is probably limited. There is >70% total canopy cover dominated by medium trees, at least 10% or more canopy cover of 1 or more smaller tree sizes. Tree size is 15"- 19" dbh, and there are two or more canopy strata.

Large Tree - Multi-story - Open

These stands have an overstory of large or giant sized trees with one or more distinct canopy layers of smaller trees. Stands > 40% cover of giant trees are classified in the "Giant, multi-storied" stage. In westside forests, stands dominated by large trees, usually have giant trees scattered in the stand, with lower numbers in eastside forests. Grass/Forb or shrub understory often present, especially in canopy gaps. There is 10-39% total canopy cover, with at least 10% or more canopy cover from large and/or giant trees and another 10% or more canopy cover from 1 or more smaller tree size classes. Tree size is 20"-29" dbh, and there are two or more canopy strata.

Large Tree - Multi-story - Moderate

These stands have an overstory of large or giant sized trees with one or more distinct canopy layers of smaller trees. Stands > 40% cover of giant trees are classified in the "Giant, multi-storied" stage. In westside forests, stands dominated by large trees, usually have giant trees scattered in the stand, with lower numbers in eastside forests. Grass/Forb or shrub understory often present, especially in canopy gaps. There is 40-69% total canopy cover, at least 10% or more canopy cover from large trees with another 10% or more canopy cover from 1 or more smaller tree size classes. Tree size is 20"-29" dbh, and there are two or more canopy strata.

Large Tree - Multi-story - Closed

These stands have an overstory of large or giant sized trees with one or more distinct canopy layers of smaller trees. Stands > 40% cover of giant trees are classified in the "Giant, multi-storied" stage. In westside forests, stands dominated by large trees, usually have giant trees scattered in the stand, with lower numbers in eastside forests. Grass/Forb or shrub understory often present, especially in canopy gaps. There is >70% total canopy cover, at least 10% or more canopy cover from large trees with another 10% or more canopy cover from 1 or more smaller tree size classes. Tree size is 20"- 29" dbh, and there are two or more canopy strata.

The total number of species associated with each forest structural class in Oregon/Washington forests O'Neil et al. (2001):

| Forest Structural Stage | Taxonomic Class | | | |
|---|---|---|---|---|
| | Birds | Mammals | Amphibians | Reptiles |
| Sapling/Pole - Open | 155 | 86 | 26 | 22 |
| Sapling/Pole - Moderate | 122 | 96 | 26 | 24 |
| Sapling/Pole - Closed | 109 | 59 | 26 | 9 |
| Small Tree - Multi-story - Open | 140 | 88 | 31 | 21 |
| Small Tree - Multi-story - Moderate | 122 | 77 | 31 | 12 |
| Small Tree - Multi-story - Closed | 106 | 65 | 31 | 8 |
| Medium Tree - Multi-story- Open | 155 | 91 | 32 | 21 |
| Medium Tree - Multi-story- Moderate | 134 | 79 | 32 | 12 |
| Medium Tree - Multi-story- Closed | 117 | 71 | 32 | 8 |
| Large Tree - Multi-story - Open | 150 | 94 | 32 | 18 |
| Large Tree - Multi-story - Moderate | 131 | 81 | 32 | 9 |
| Large Tree - Multi-story - Closed | 115 | 76 | 32 | 8 |

In a case history study in the Blue Mountains, as described by Sallabanks et al. (2001), it was concluded that few species exhibited significant "selection" for structural class. This suggests that the structural attributes and habitat elements required by most species are present in several structural classes rather than being restricted to just one. Therefore, when attempting to maintain avian diversity, structural classes per se may not be relevant and are not likely to be limiting for most species. Instead, to provide suitable habitat for most species, a rather broad range of structural continuum may be required, as long as the key habitat elements (e.g. snags), and structural attributes (canopy cover, understory) are provided at different levels throughout the range. This can be confirmed when analyzing the above table for the number of species utilizing each structural class.

Many wildlife species that inhabit Eastside (interior) forests and woodlands might be considered "associates" of specific forest communities, they are not often considered "obligates". Thus, Sallabanks et al. (2001) does not generally consider the distributional aspects of any of the Eastside (interior) forest and woodland habitats to be limiting for wildlife. Possible exceptions to this might exist for species that inhabit upland aspen and old-growth ponderosa pine, because of the patchy distribution of these habitats across the landscape. Species know to be associated with old-growth ponderosa pine include the white-headed woodpecker, white-breasted nuthatch, and flammulated owl.

Rochelle (2002) states that enough information exists to suggest that thinning and prescribed fire have the greatest potential for achieving the dual objectives of fuel reduction and maintenance of wildlife habitat. Some examples of specific ways in which thinning can be carried out with acceptable effects to wildlife include:

- Thinning to remove smaller or lower-quality understory trees while retaining larger, more fire resistant trees, followed by prescribed burning to reduce surface fuels.
- Retention of some portion of the largest trees of those species with greatest value to wildlife, e.g., western larch and ponderosa pine, which are preferred by pileated woodpeckers and many other cavity nesting species, as well as grand fir, which developed hollow stems in this region is selected by Vaux's swifts, bats, and a number of other wildlife species.
- Maintenance of some un-thinned, high density patches within the thinned stand to serve as nesting habitat for species that require closed canopy conditions. Un-thinned patches might range from a few acres to several hundred acres in size, depending on wildlife species of interest.
- Depending on past mortality patterns and numbers of dead trees present, retaining snags and large woody debris in a range of sizes, decay stages, and distributions. Emphasis should be on the retention of large snags (18-20" in diameter or larger) that meet the needs of the greatest number of species and require the longest time to replace.
- Using measures such as timing and pattern of burning to reduce consumption of down logs in post thinning prescribed fires.

Although some short-term risk of temporarily reducing habitat quality is associated with any or all of these practices, the choice to do nothing presents a long-term and more significant risk of losing entire late seral forest stages to stand replacement fires. Some evidence suggests that treatments such as thinning and underburning do not pose high risks to vertebrate wildlife, provided that acceptable levels of key habitat structures and stand conditions required by the most sensitive species are maintained (Rochelle 2002).

Estimated Percent trees per acre and basal area per acre by tree size in the LCM analysis area.

| Tree Size | % Total Trees Per Acre | % Total Basal Area Per Acre |
|---|---|---|
| Sapling /Pole 1-9" dbh | 80 | 24 |
| Small Tree 10-14" dbh | 14 | 32 |
| Medium Tree 15-19" dbh | <5 | 21 |
| Large Tree 20-29" dbh | <2 | 19 |
| Giant Tree $30" dbh | <1 | 4 |

Estimated number of acres in the LCM analysis area by basal area and canopy closure.

| Basal Area ($ft^2$ per acre) | Estimated % Canopy Closure | Structural Definition | Estimated Number of Acres | Percent of Total |
|---|---|---|---|---|
| 10-60 | 10-39 | Open | 721 | 29 |
| 60-120 | 40-69 | Moderate | 805 | 32 |
| 120+ | 70-100 | Closed | 956 | 39 |

It is recognized that because of the fuels reduction nature of this project close to the urban interface, the recommendations for down logs will more than likely not be met. A return to a more natural disturbance regime would result in the loss of dead wood that has developed from fire exclusion (Sallabanks et al. 2001).

**No Action Alternative:**

The number of acres in each forest structural class is relatively evenly distributed in the LCM analysis area, but because of the high percentage of trees per acre being in the sapling/pole and small tree size class (" 94%), competition between tree species and fuel loading are causing reduced tree vigor and an increase in risk for intense wildfire occurrence.

The reduced vigor associated with dense forest stands, changes in forest composition, and the attendant mortality due to competition and infestation by insects and diseases, add up to a mixed blessing for certain wildlife groups, notably the cavity nesters and down wood associates. Abundant foods are available in the form of insects, as are abundant sites for cavity construction. The negative aspect is that this condition is conducive to high-intensity wildfires, which may eliminate habitat for many species (Rochelle 2002).

Failure to reduce fuel loads will increase the potential for an intense burn in the analysis area. A three-year study in the Blue Mountains, as reported by Sallabanks et al. (2001), looked at breeding bird communities and their relation to severity of wildfires. Overall, wildfire had a somewhat negative effect, reducing bird species richness wherever burn intensity was the highest. Cavity nesting birds in general, but especially the hairy woodpecker, mountain bluebird, and black-backed woodpecker, responded positively to fire. The increase in availability of snags and open areas were considered the reasons for this increase.

Steele (1994) conveys that the two greatest immediate threats to future viability of ponderosa pine forests are high severity fire occurrences and increased site-specific competition for nutrients and moisture that result in reduced ponderosa pine regeneration and increased mortality over the long term. Allowing these forests to burn under a high severity fire regime to “reset the balance” is considered by some to be a non-viable alternative for restoration of these forests. Such fires could eliminate what little old growth remains, as well as have detrimental effects on wildlife. The degree to which levels of food, cover, and structural features are changed depends on the characteristics of the particular fire.

As described by Rochelle (2002), the effect of fire, then, is to change the structural stage, at the expense of some species and to the benefit of others. These changes result in “winners” and “losers” with respect to the suitability of habitat. In the case of stand replacement fire, the forest is returned to the grass-forb stage which favors ground and shrub nesting species, weed and grass eaters, and grazers and browsers. Specific examples include many neotropical migrant birds such as the chipping sparrow and lazuli bunting (Saab and Dudley 1998), and many species of rodents, such as the deer mouse, pocket gopher, and creeping vole. To the extent that snags remain, cavity nesting species associated with open habitats will also be present. While larger species such as black bear, deer and elk benefit from the enhanced forage conditions in early structural stages. They also have some requirement for cover in older stages as reflected in their larger home ranges. While early successional species benefit, wildlife species associated with later stages of forest development are negatively affected. Conifer

seed eaters such as tree squirrels, foliage feeders such as warblers are examples of species whose habitat may be locally eliminated with the loss of older forests.

Because of high road densities, big game would benefit from increased hiding cover and decreased site distance from roads in the short term. When an intense burn occurs in the area at some point in the future, this would be foregone and much of the hiding cover would be consumed in the fire.

**Alternative B:**

This Alternative would change forest structure for wildlife species on 225 acres. Only trees 12" dbh and less would be cut, therefore the percentage of trees (by size class) that would remain in an average stand on the 225 acres would be as follows:

| **Tree Size** | **dbh** | **Percent** |
|---|---|---|
| *Sapling/Pole* | 1-9" | 0% |
| *Small Tree* | 10-14" | 55% |
| *Medium Tree* | 15-19" | 28% |
| *Large Tree* | 20-29" | 14% |
| *Giant Tree* | $\geq$ 30" | 3% |

Canopy cover would be expected to be in the moderate and closed / multi-story structural categories.

The remaining acreage in the analysis area would remain untreated and have affects the same as described in the No Action Alternative.

**Alternative C:**

This Alternative would change forest structure for wildlife species as described in the following table:

| Basal Area ($ft^2$ per acre) | Estimated % Canopy Closure | Structural Definition | Estimated Treatment Acres | Estimated Non-Treatment Acres | Percent of Total | % Change from Existing |
|---|---|---|---|---|---|---|
| 10-60 | 10-39 | Open | 1202 | 113 | 53 | +24 |
| 60-120 | 40-69 | Moderate | 777 | 113 | 36 | +4 |
| 120+ | 70-100 | Closed | 105 | 178 | 11 | -26 |

A reduction in curl-leaf mountain mahogany and western juniper would occur under this alternative. The targeting of western juniper and thinning of mahogany stands would displace some of those species that utilize these habitat types to others areas on private or National Forest land that have these habitats available. The thinning of the mahogany stands should result in increased establishment of mahogany seedlings, which, in turn should make more browse available for big game that utilize the area.

This Alternative would provide marginal cover for big game on approximately 890 acres (canopy closure of 40-69%) of treatment area and optimal canopy cover on approximately 283 acres (canopy closure >70%). Treatment of areas adjacent to existing roads and trails reduces habitat security and increases the potential for disturbance and poaching of big game.

**Alternative D:**

This Alternative would change forest structure for wildlife species as described in the following table:

| Basal Area ($ft^2$ per acre) | Estimated % Canopy Closure | Structural Definition | Estimated Treatment Acres | Estimated Non-Treatment Acres | Percent of Total | % Change from Existing |
|---|---|---|---|---|---|---|
| 10-60 | 10-39 | Open | 2091 | 113 | 88 | +59 |
| 60-120 | 40-69 | Moderate | 0 | 113 | 5 | -27 |
| 120+ | 70-100 | Closed | 0 | 178 | 7 | -32 |

Ten acres of conifer overstory removal would occur in riparian areas. While this would reduce the conifer component in the riparian area, this alternative would release some of the suppressed hardwoods potentially increasing the riparian habitat component.

Although additional road construction would increase road densities in the upland habitat component, the decreased road density in the riparian area would increase habitat security. This would benefit those species that utilize riparian areas.

Construction of 1 mile of new fence would increase the potential to disrupt normal movement patterns for big game, which, under extreme situations, may result in death from collisions, entanglement, or entrapment (Kindschy 1996). Proper fence design and use of appropriate construction materials can reduce the adverse effects of fences. Fence construction would reduce the grazing impacts currently observed in the riparian area and benefit those species that utilize riparian areas.

This Alternative would provide marginal cover for big game on approximately 113 acres (canopy closure of 40-69%) of treatment area and optimal canopy cover on approximately 178 acres (canopy closure >70%). Treatment of areas adjacent to existing roads and trails reduces habitat security and increases the potential for disturbance and poaching of big game.

**Alternative E:**

This Alternative would change forest structure for wildlife species as described in the following table:

| Basal Area ($ft^2$ per acre) | Estimated % Canopy Closure | Structural Definition | Estimated Treatment Acres | Estimated Non-Treatment Acres | Percent of Total | % Change from Existing |
|---|---|---|---|---|---|---|
| 10-60 | 10-39 | Open | 1263 | 113 | 56 | +27 |
| 60-120 | 40-69 | Moderate | 933 | 113 | 42 | +10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 120+ | 70-100 | Closed | 0 | 45 | 2 | -37 |

Ten acres of conifer overstory removal would occur in riparian areas. While this would reduce the conifer component in the riparian area, this alternative would release some of the suppressed hardwoods potentially increasing the riparian habitat component.

Although additional road construction would increase road densities in the upland habitat component, the decreased road density in the riparian area would increase habitat security. This would benefit those species that utilize riparian areas.

Construction of 1 mile of new fence would increase the potential to disrupt normal movement patterns for big game, which, under extreme situations, may result in death from collisions, entanglement, or entrapment (Kindschy 1996). Proper fence design and use of appropriate construction materials can reduce the adverse effects of fences. Fence construction would reduce the grazing impacts currently observed in the riparian area and benefit those species that utilize riparian areas.

This Alternative would provide marginal cover for big game on approximately 113 acres (canopy closure of 40-69%) of treatment area and optimal canopy cover on approximately 178 acres (canopy closure >70%). Treatment of areas adjacent to existing roads and trails reduces habitat security and increases the potential for disturbance and poaching of big game.

**Alternative F:**

This Alternative would change forest structure for wildlife species as described in the following table:

| Basal Area ($ft^2$ per acre) | Estimated % Canopy Closure | Structural Definition | Estimated Treatment Acres | Estimated Non-Treatment Acres | Percent of Total | % Change from Existing |
|---|---|---|---|---|---|---|
| 10-60 | 10-39 | Open | 1170 | 113 | 58 | +29 |
| 60-120 | 40-69 | Moderate | 588 | 113 | 36 | +4 |
| 120+ | 70-100 | Closed | 92 | 45 | 6 | -33 |

This Alternative would provide the greatest diversity for wildlife. Treating forest stands based on habitat type and leaving 185 acres of with a higher basal area would provide the greatest diversity of habitat and structure, and have more of a mosaic appearance, than any other Alternative.

This Alternative would provide marginal cover for big game on approximately 701 acres (canopy closure of 40-69%) of treatment area and optimal canopy cover on approximately 137 acres (canopy closure >70%). Treatment of areas adjacent to existing roads and trails reduces habitat security and increases the potential for disturbance and poaching of big game.

## Threatened, Endangered, and Sensitive Species

Summary of Conclusion of Effects to Listed and Special Status Species

| Wildlife Species | Listing | Habitat Present | Effects |
|---|---|---|---|
| **Northern bald eagle** | **threatened** | | |
| **Canada Lynx** | **threatened** | | |
| **Northern Spotted Owl** | **threatened** | | |
| Yellow-billed Cuckoo | federal candidate | | |
| Washington Ground Squirrel | federal candidate | | |
| Oregon Spotted Frog | federal candidate | | |
| Northern Goshawk | sensitive | √ | MIIH |
| Ferruginous Hawk | sensitive | | |
| American Perigrine Falcon | sensitive | | |
| Flammulated Owl (BM) | sensitive | √ | MIIH |
| Northern Pygmy owl (BM) | sensitive | √ | MIIH |
| Burrowing Owl | sensitive | | |
| White-headed Woodpecker | sensitive | √ | MIIH |
| Black-backed Woodpecker (BM) | sensitive | √ | MIIH |
| Three-Toed Woodpecker (BM) | sensitive | √ | MIIH |
| Pygmy Nuthatch (BM) | sensitive | √ | MIIH |
| Townsend's Big-eared Bat | sensitive | √ | MIIH |
| Fisher | sensitive | √ | MIIH |
| Columbian Sharp-tailed Grouse | sensitive | | |
| Greater Sage Grouse | sensitive | | |
| Harlequin Duck | sensitive | | |
| Upland Sandpiper | sensitive | | |
| Yellow Rail | sensitive | | |
| Painted Turtle | sensitive | | |
| Western Pond Turtle | sensitive | | |
| Northern Leopard Frog | sensitive | | |
| Cope's Giant Salamander | assessment | | |
| Tricolored Blackbird (HP) | assessment | | |
| Pygmy Rabbit | assessment | | |
| Brazilian Free-Tailed Bat | assessment | | |
| Spotted Bat | assessment | | |

(BM) = Blue Mountains area only (HP) = High Lava Plains Area only

| *Determination for Federally Listed and Proposed Species* | *Determination for Special Status Species* |
|---|---|
| NE = No Effect<br>NLAA = May Effect – Not Likely to Adversely Affect<br>LAA* = May Effect – Likely to Adversely Affect<br>BE = Beneficial Effect | NI = No Impact<br>MIIH = May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species<br>WIFV* = Will Impact Individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species<br>BI = Beneficial Impact |

** Trigger for a Significant Action As Defined in NEPA*

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